

Amendments to the Claims: This listing of claims will replace all prior versions, and listings, of claims in the application

Listing of Claims:

1. (Original) A communication system comprising a first information processor, a second information processor, a first communication control unit for controlling the communication of the first information processor, and a second communication control unit for controlling the communication of the second information processor,

wherein the first information processor includes:

a bubble packet transmitter for transmitting a bubble packet for leaving transmission record in the first communication control unit to the second communication control unit via the first communication control unit, and

a reply packet receiver for receiving a reply packet transmitted from the second information processor via the second communication control unit to a bubble packet transmitting port, a port of the first communication control unit, which is used in transmission of the bubble packet, and

the second information processor includes:

a reply packet transmitter for transmitting the reply packet to one or more ports including at least the bubble packet transmitting port.

2. - 106. (Cancelled)

107. (New) The communication system of claim 1, further comprising a server,

wherein the first information processor further includes:

a range detection packet transmitter for transmitting a range detection packet used for detecting the range of ports including the bubble packet transmitting port to the server, and

the server includes:

a range detector which receives the range detection packet for detecting the range of ports including the bubble packet transmitting port in accordance with the range detection packet;

a range transmitter for transmitting range information detected by the range detector as information showing the range of ports including the bubble packet transmitting port to the second information processor, and

the second information processor further includes:

a range receiver for receiving the range information, and

the reply packet transmitter transmits the reply packet to ports in a range indicated by the range information.

108. (New) The communication system of claim 107,

wherein the range detection packet transmitter of the first information processor transmits the range detection packet before and/or after transmission of the bubble packet, and

the range receiver of the server receives the range detection packet transmitted before and/or after transmission of the bubble packet.

109. (New) The communication system of claim 107,

wherein the first information processor further includes:

a port number differential detection packet transmitter for transmitting a port number differential detection packet for detecting a port number differential in the first communication control unit to the server via the first communication control unit;

the server further includes:

a port number differential detector which receives the port number differential detection packet for detecting a port number differential in the first communication control unit in accordance with the port number differential detection packet;

a port number differential information transmitter for transmitting port number differential information detected by the port number differential detector as information showing the port number differential of the first communication control unit to the second information processor;

the second information processor further includes a port number differential information receiver for receiving the port number differential information, and

the reply packet transmitter transmits the reply packet every port number differential indicated by the port number differential information.

110. (New) The communication system of claim 1, further comprising a server,

wherein the first information processor further includes:

a range detection packet transmitter for transmitting a range detection packet used for detecting the range of ports including the bubble packet transmitting port to the server;

a detection port information receiver for receiving detection port information showing the port position of the first communication control unit through which the range detection packet has passed;

a range detector for detecting the range of ports including the bubble packet transmitting port in accordance with detection port information received by the detection port information receiver;

a range transmitter for transmitting range information detected by the range detector as information showing the range of ports including the bubble transmitting port, and

the server further includes:

a detection port detector which receives the range detection packet for detecting the port position of the first communication control unit through which the range detection packet has passed;

a detection port information transmitter for transmitting detection port information showing the port position detected by the detection port detector to the first information processor, and

the second information processor further includes:

a range receiver for receiving the range information, and

the reply packet transmitter transmits the reply packet to ports in the range indicated by the range information.

111. (New) The communication system of claim 110,

wherein the range detection packet transmitter of the first information processor transmits the range detection packet before and/or after transmission of the bubble packet, and

the range receiver of the server receives the range detection packet before and/or after transmission of the bubble packet.

112. (New) The communication system of claim 110,

wherein the first information processor further includes:

a port number differential detection packet transmitter for transmitting a port number differential detection packet for detecting the port number differential in the first communication control unit to the server via the first communication control unit;

a port differential information detector port information receiver for receiving port differential information detector port information showing the port position of the first communication control unit through which the port number differential detection packet has passed;

a port number differential detector for detecting the port number differential in the first communication control unit in accordance with port differential information detector port information received by the port differential information detector port information receiver;

a port number differential information transmitter for transmitting port number differential information detected by the port number differential detector as information showing the port number differential of the first communication control unit to the second information processor via the server, and

the server further includes:

a port differential information detector port detector which receives the port number differential detection packet for detecting the port position of the first communication control unit through which the port number differential detection packet has passed in accordance with the port number differential detection packet;

a port differential information detector port information transmitter for transmitting port differential information detector port information showing the port position detected by the port differential information detector port detector to the first information processor, and

the second information processor further includes:

a port number differential information receiver for receiving the port number differential information, and

the reply packet transmitter transmits the reply packet every port number differential indicated by the port number differential information.

113. (New) A communication system comprising:

a first information processor, a second information processor, a first communication control unit for controlling the communication of the first information processor, a second communication control unit for controlling the communication of the second information processor, and a server for establishing communication between the first information processor and the second information processor,

wherein the first information processor includes:

a bubble packet transmitter for transmitting a bubble packet for leaving transmission record in the first communication control unit to the second communication control unit via the first communication control unit;

a range detection packet transmitter for transmitting a range detection packet used for detecting the range of ports including the bubble packet transmitting port to the server;

a reply packet receiver for receiving the reply packet transmitted from the second information processor via the second communication control unit to the bubble packet transmitting port, a port of the first communication control unit, which is used in transmission of the bubble packet, and

the port position of the first communication control unit used in transmission of the range detection packet is different from the position of the bubble packet transmitting port, a port of the first communication control unit, which is used in transmission of the bubble packet, and

the server includes:

a range detector which receives the range detection packet for detecting the range of ports including the bubble packet transmitting port in accordance with the range detection packet;

a range transmitter for transmitting range information detected by the range detector as information showing the range of ports including the bubble packet transmitting port to the second information processor, and

the second information processor includes:

a range receiver for receiving the range information;

a reply packet transmitter for transmitting the reply packet to at least one or more ports including the bubble packet transmitting port, and

the reply packet transmitter transmits the reply packet to ports in the range indicated by the range information.

114. (New) The communication system of claim 113,

wherein the range detection packet transmitter of the first information processor transmits the range detection packet before and/or after transmission of the bubble packet, and

the range receiver of the server receives the range detection packet transmitted before and/or after transmission of the bubble packet.

115. (New) The communication system of claim 113,

wherein the first information processor further includes:

a port number differential detection packet transmitter for transmitting a port number differential detection packet for detecting the port number differential in the first communication control unit to the server via the first communication control unit, and

the server further includes:

a port number differential detector which receives the port number differential detection packet for detecting the port number differential in the first communication control unit in accordance with the port number differential detection packet;

a port number differential information transmitter for transmitting port number differential information detected by the port number differential detector as information showing the port number differential of the first communication control unit to the second information processor, and

the second information processor further includes a port number differential information receiver for receiving the port number differential information, and

the reply packet transmitter transmits the reply packet every port number differential indicated by the port number differential information.

116. (New) A communication system comprising:

a first information processor, a second information processor, a first communication control unit for controlling the communication of the first information processor, a second communication control unit for controlling the communication of the second information processor, and a server for establishing communication between the first information processor and the second information processor,

wherein the first information processor includes:

a bubble packet transmitter for transmitting a bubble packet for leaving transmission record in the first communication control unit to the second communication control unit via the first communication control unit;

a range detection packet transmitter for transmitting a range detection packet used for detecting the range of ports including the bubble packet transmitting port to the server;

a detection port information receiver for receiving detection port information showing the port position of the first communication control unit through which the range detection packet has passed;

a range detector for detecting the range of ports including the bubble packet transmitting port in accordance with detection port information received by the detection port information receiver;

a range transmitter for transmitting range information showing the range of ports including the bubble packet transmitting port detected by the range detector;

a reply packet receiver for receiving the reply packet transmitted from the second information processor via the second communication control unit to the bubble packet transmitting port, a port of the first communication control unit, which is used in transmission of the bubble packet, and

the port position of the first communication control unit used in transmission of the range detection packet is different from the position of the bubble packet transmitting port, a port of the first communication control unit, which is used in transmission of the bubble packet, and

the server includes:

a detection port detector which receives the range detection packet for detecting the port position of the first communication control unit through which the range detection packet has passed;

a detection port information transmitter for transmitting detection port information detected by the detection port detector as information showing the port position to the first information processor, and

the second information processor includes:

a range receiver for receiving the range information;

a reply packet transmitter for transmitting the reply packet to one or more ports including the bubble packet transmitting port, and

the reply packet transmitter transmits the reply packet to ports in the range indicated by the range information.

117. (New) The communication system of claim 116,

wherein the range detection packet transmitter of the first information processor transmits the range detection packet before and/or after transmission of the bubble packet, and

the range receiver of the server receives the range detection packet transmitted before and/or after transmission of the bubble packet.

118. (New) The communication system of claim 116,

wherein the first information processor further includes:

a port number differential detection packet transmitter for transmitting a port number differential detection packet for detecting the port number differential in the first communication control unit to the server via the first communication control unit;

a port differential information detector port information receiver for receiving port differential information detector port information showing the port position of the first communication control unit through which the port number differential detection packet has passed;

a port number differential detector for detecting the port number differential in the first communication control unit in accordance with port differential information detector port information received by the port differential information detector port information receiver;

a port number differential information transmitter for transmitting port number differential information detected by the port number differential detector as information showing the port number differential of the first communication control unit to the second information processor via the server, and

the server further includes:

a port differential information detector port detector which receives the port number differential detection packet for detecting the port number differential of the first communication control unit through which the port number differential detection packet has passed in accordance with the port number differential detection packet;

a port differential information detector port information transmitter for transmitting port differential information detector port information showing the port position detected by the port differential information detector port detector to the first information processor, and

the second information processor further includes a port number differential information receiver for receiving the port number differential information, and

the reply packet transmitter transmits the reply packet every port number differential indicated by the port number differential information.

119. (New) A first information processor communicating with a second information processor via a first communication control unit for controlling the communication of the first information processor and a second communication control unit for controlling the communication of the second information processor, comprising:

a bubble packet transmitter for transmitting a bubble packet for leaving transmission record in the first communication control unit to the second communication control unit via the first communication control unit;

a range detection packet transmitter for transmitting a range detection packet used for detecting the range of ports including the bubble packet transmitting port; and

a reply packet receiver for receiving the reply packet transmitted from the second information processor via the second communication control unit to the bubble packet transmitting port, a port of the first communication control unit, which is used in transmission of the bubble packet.

120. (New) The first information processor of claim 119,

wherein the range detection packet transmitter transmits the range detection packet before and/or after the bubble packet is transmitted by the bubble packet transmitter.

121. (New) The first information processor of claim 119, further comprising:

a port number differential detection packet transmitter for transmitting a port number differential detection packet for detecting the port number differential in the first communication control unit to the server via the first communication control unit.

122. (New) The first information processor of claim 119, further comprising:

a detection port information receiver for receiving detection port information showing the port position of the first communication control unit through which the range detection packet has passed;

a range detector for detecting the range of ports including the bubble packet transmitting port in accordance with detection port information received by the detection port information receiver; and

a range transmitter for transmitting range information detected by the range detector as information showing the range of ports including the bubble packet transmitting port.

123. (New) The first information processor of claim 122, further comprising:

a port number differential detection packet transmitter for transmitting a port number differential detection packet for detecting the port number differential in the first communication control unit to the server via the first communication control unit;

a port differential information detector port information receiver for receiving port differential information detector port information showing the port position of the first

communication control unit through which the port number differential detection packet has passed;

a port number differential detector for detecting the port number differential in the first communication control unit in accordance with port differential information detector port information received by the port differential information detector port information receiver;

a port number differential information transmitter for transmitting port number differential information detected by the port number differential detector as information showing the port number differential of the first communication control unit to the second information processor via the server; and

a port number differential detection packet transmitter for transmitting port number differential detection packet for detecting the port number differential in the first communication control unit to the server via the first communication control unit.

124. (New) A first information processor communicating with a second information processor via a first communication control unit for controlling the communication of the first information processor and a second communication control unit for controlling the communication of the second information processor, comprising:

a bubble packet transmitter for transmitting a bubble packet for leaving transmission record in the first communication control unit to the second communication control unit via the first communication control unit;

a range detection packet transmitter for transmitting a range detection packet used for detecting the range of ports including the bubble packet transmitting port; and

a reply packet receiver for receiving the reply packet transmitted from the second information processor via the second communication control unit to the bubble packet transmitting port, a port of the first communication control unit, which is used in transmission of the bubble packet,

wherein the port position of the first communication control unit used in transmission of the range detection packet is different from the position of the bubble packet transmitting port, a port of the first communication control unit, which is used in transmission of the bubble packet.

125. (New) The first information processor of claim 124,

wherein the range detection packet transmitter transmits the range detection packet before and/or after the bubble packet is transmitted by the bubble packet transmitter.

126. (New) The first information processor of claim 124, further comprising:

a port number differential detection packet transmitter for transmitting a port number differential detection packet for detecting the port number differential in the first communication control unit to the server via the first communication control unit.

127. (New) The first information processor of claim 124, comprising:

a detection port information receiver for receiving detection port information showing the port position of the first communication control unit through which the range detection packet has passed;

a range detector for detecting the range of ports including the bubble packet transmitting port in accordance with detection port information received by the detection port information receiver; and

a range transmitter for transmitting range information showing the range of ports including the bubble packet transmitting port detected by the range detector.

128. (New) The first information processor of claim 127,

wherein the range detection packet transmitter transmits the range detection packet before and/or after the bubble packet is transmitted by the bubble packet transmitter.

129. (New) The first information processor of claim 127, further comprising:

a port number differential detection packet transmitter for transmitting a port number differential detection packet for detecting the port number differential in the first communication control unit to the server via the first communication control unit;

a port differential information detector port information receiver for receiving port differential information detector port information showing the port position of the first communication control unit through which the port number differential detection packet has passed;

a port number differential detector for detecting the port number differential in the first communication control unit in accordance with the port differential information detector port

information received by the port differential information detector port information receiver;
and

a port number differential information transmitter for transmitting port number differential information detected by the port number differential detector as information showing the port number differential of the first communication control unit to the second information processor via the server.

130. (New) A server for establishing communication between a first information processor and a second information processor via a first communication control unit for controlling the communication of the first information processor and a second communication control unit for controlling the communication of the second information processor, comprising:

an information transmitter-receiver for transmitting and receiving information to and from the first information processor and the second information processor;

a characteristic determining unit for determining the characteristics of the first communication control unit and the second communication control unit; and

a transmission and reception determining unit for determining either one of the first information processor and the second information processor to be a transmission side (transmission side information processor) and the other to be a reception side (reception side information processor) in accordance with the result obtained by the characteristic determining unit.

131. (New) A first information processor communicating with a second information processor via a first communication control unit for controlling the communication of the first information processor and a second communication control unit for controlling the communication of the second information processor,

wherein a bubble packet for leaving communication record in the second communication control unit is transmitted from the second information processor to the first communication control unit via the second communication control unit, comprising:

a reply packet transmitter for transmitting a reply packet to one or more ports including at least a port of the second communication control unit used in transmission of the bubble packet from the second information processor.

132. (New) The first information processor of claim 131, further comprising:

a range receiver for receiving range information showing the range of ports for transmitting the reply packet,

wherein the reply packet transmitter transmits the reply packet to ports in the range indicated by the range information.

133. (New) The first information processor of claim 131, further comprising:

a port number differential information receiver for receiving port number differential information showing the port number differential for transmitting the reply packet,

wherein the reply packet transmitter transmits the reply packet every port number differential indicated by the port number differential information.

134. (New) The first information processor of claim 132, further comprising:

a port number differential information receiver for receiving port number differential information showing the port number differential for transmitting the reply packet,

wherein the reply packet transmitter transmits the reply packet every port number differential indicated by the port number differential information.

135. (New) A communication method used in the information processor of a communication system comprising an information processor, a communication control unit for controlling the communication of the information processor, and a server, comprising:

a bubble packet transmitting step for transmitting a bubble packet for leaving transmission record to the communication control unit via the communication control unit;

a range detection packet transmitting step for transmitting a range detection packet used for detecting the range of ports including the bubble packet transmitting port; and

a reply packet receiving step for receiving a reply packet transmitted to one or more ports including at least the bubble packet transmitting port.

136. (New) The communication method of claim 135,

wherein the port detection packet is transmitted before and/or after the bubble packet is transmitted in the bubble packet transmitting step.

137. (New) The communication method of claim 135, further comprising:

a port number differential detection packet transmitting step for transmitting a port number differential detection packet for detecting the port number differential in the communication control unit to the server via the communication control unit.

138. (New) The communication method of any one of claim 135, further comprising:

a detection port information receiving step for receiving detection port information showing the port position of the communication control unit through which the range detection packet has passed;

a range detecting step for detecting the range of ports including the bubble packet transmitting port in accordance with detection port information received by the detection port information receiver; and

a range transmitting step for transmitting range information detected by the range detector as information showing the range of ports including the bubble packet transmitting port.

139. (New) The communication method of any one of claim 136, further comprising:

a detection port information receiving step for receiving detection port information showing the port position of the communication control unit through which the range detection packet has passed;

a range detecting step for detecting the range of ports including the bubble packet transmitting port in accordance with detection port information received by the detection port information receiver; and

a range transmitting step for transmitting range information detected by the range detector as information showing the range of ports including the bubble packet transmitting port.

140. (New) The communication method of any one of claim 137, further comprising:

a detection port information receiving step for receiving detection port information showing the port position of the communication control unit through which the range detection packet has passed;

a range detecting step for detecting the range of ports including the bubble packet transmitting port in accordance with detection port information received by the detection port information receiver; and

a range transmitting step for transmitting range information detected by the range detector as information showing the range of ports including the bubble packet transmitting port.

141. (New) The communication method of claim 134, further comprising:

a port number differential detection packet transmitting step for transmitting a port number differential detection packet for detecting the port number differential in the communication control unit to the server via the communication control unit;

a port differential information detector port information receiving step for receiving port differential information detector port information showing the port position of the communication control unit through which the port number differential detection packet has passed;

a port number differential detecting step for detecting the port number differential in the communication control unit in accordance with port differential information detector port information received by the port differential information detector port information receiver; and

a port number differential transmitting step for transmitting port number differential information detected by the port number differential detector as information showing the port number differential of the communication control unit via the server.

142. (New) A communication method used in the server of a communication system comprising a first information processor, a second information processor, a first communication control unit for controlling the communication of the first information processor, a second communication control unit for controlling the communication of the second information processor, and a server, comprising:

an information transmitting-receiving step for transmitting and receiving information to and from the first information processor and the second information processor

a characteristic determining step for determining the characteristics of the first communication control unit and the second communication control unit; and

a transmission and reception determining step for determining either one of the first information processor and the second information processor to be a transmission side (transmission side information processor) and the other to be a reception side (reception side information processor) in accordance with the result obtained by the characteristic determining unit.

143. (New) A communication method used in the second information processor of a communication system comprising a first information processor, a communication control unit for controlling the communication of the first information processor, a second information processor, and a second communication control unit for controlling the communication of the second information processor,

wherein a bubble packet for leaving communication record in the second communication control unit is transmitted from the second information processor to the first communication control unit via the second communication control unit, comprising:

a reply packet transmitting step for transmitting a reply packet to one or more ports including at least a port of the second communication control unit used in transmission of the bubble packet from the second information processor.

144. (New) The communication method of claim 140, further comprising:

a range receiving step for receiving range information showing the port range for transmitting the reply packet,

wherein the reply packet is transmitted to ports in the range indicated by the range information in the reply packet transmitting step.

145. (New) The communication method of claim 141, further comprising:

a port number differential receiving step for receiving port number differential information showing the port number differential for transmitting the reply packet,

wherein the reply packet is transmitted every port number differential indicated by the port number differential information in the reply packet transmitting step.

146. (New) A communication method used in the information processor of a communication system comprising an information processor, a communication control unit for controlling the communication of the information processor, and a server, comprising:

a bubble packet transmitting step for transmitting a bubble packet for leaving transmission record to the communication control unit;

a range detection packet transmitting step for transmitting a range detection packet used for detecting the range of ports including the bubble packet transmitting port;

a reply packet receiving step for receiving the reply packet transmitted to one or more ports at least including a port of the communication control unit included in the range of ports including the bubble packet transmitting port.

wherein the port position of the communication control unit used in transmission of the range detection packet is different from the position of the bubble packet transmitting port, a port of the communication control unit, which is used in transmission of the bubble packet.

147. (New) The communication method of claim 143,

wherein the port detection packet is transmitted before and/or after the bubble packet is transmitted in the bubble packet transmitting step.

148. (New) The communication method of claim 143, further comprising:

a port number differential detection packet transmitting step for transmitting a port number differential detection packet for detecting the port number differential in the communication control unit to the server via the communication control unit.

149. (New) The communication method of any one of claims 143, further comprising:

a detection port information receiving step for receiving detection port information showing the port position of the communication control unit through which the range detection packet has passed;

a range detecting step for detecting the range of ports including the bubble packet transmitting port in accordance with detection port information received in the detection port information receiving step; and

a range transmitting step for transmitting range information detected by the range detector as information showing the range of ports including the bubble packet transmitting port.

150. (New) The communication method of any one of claims 144, further comprising:

a detection port information receiving step for receiving detection port information showing the port position of the communication control unit through which the range detection packet has passed;

a range detecting step for detecting the range of ports including the bubble packet transmitting port in accordance with detection port information received in the detection port information receiving step; and

a range transmitting step for transmitting range information detected by the range detector as information showing the range of ports including the bubble packet transmitting port.

151. (New) The communication method of any one of claims 145, further comprising:

a detection port information receiving step for receiving detection port information showing the port position of the communication control unit through which the range detection packet has passed;

a range detecting step for detecting the range of ports including the bubble packet transmitting port in accordance with detection port information received in the detection port information receiving step; and

a range transmitting step for transmitting range information detected by the range detector as information showing the range of ports including the bubble packet transmitting port.

152. (New) The communication method of claim 146, further comprising:

a port number differential detection packet transmitting step for transmitting port number differential detection packet for detecting the port number differential in the communication control unit to the server via the communication control unit;

a port differential information detector port information receiving step for receiving port differential information detector port information showing the port position of the communication control unit through which the port number differential detection packet has passed;

a port number differential detecting step for detecting the port number differential in the communication control unit in accordance with port differential information detector port

information received in the port differential information detector port information receiving step; and

a port number differential transmitting step for transmitting port number differential information detected by the port number differential detector as information showing the port number differential of the communication control unit via the server.